

FINAL

BALTIMORE HARBOR NUTRIENTS TMDLS
APPENDIX A: Baseline Scenario Dissolved Oxygen Criteria Attainment Assessment

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How to Read the CFD Reference/Attainment Curve Graphs: Following the two adopted CBP Reference Curves below, the figures in this appendix for assessment of baseline scenario DO criteria attainment are graphs expressing time (vertical axis) and volume (horizontal axis) from 0-100% (the entire area of the graph). Where the attainment curve is below the reference curve there is depicted an area of “allowable” exceedance (*i.e.*, the criterion is attained). Where the attainment curve is above the reference curve, there is depicted a certain percentage of “non-allowable” criteria exceedance (nonattainment). This percentage is calculated both for time (vertically) and volume (horizontally) as that area between the two curves taken as a fraction of the total time-volume expressed by the entire area of the graph (100% of time and volume). For example, in Figure A4 below, “Baseline Scenario DO Criteria Attainment Assessment for the Migratory Fish Spawning and Nursery Designated Use”, the area between the solid line of the reference curve and the dotted line of the attainment curve, *where it rises above the reference curve*, is equal to 3% of the entire time and space depicted, and is therefore considered to represent a criteria exceedance of 3%.

For the dissolved oxygen (DO) criteria assessment of the baseline conditions scenario in the Baltimore Harbor, the reference curves established by the Chesapeake Bay Program (CBP) were used for Open Water and Deep Water Designated Use Habitats. The Migratory Fish and Spawning Nursery Designated Use analysis was conducted using the Open Water reference curve. The Deep Channel Designated Use does not have an established reference curve. The attainment assessment for this designated use during the baseline conditions scenario is presented at the end of this appendix.

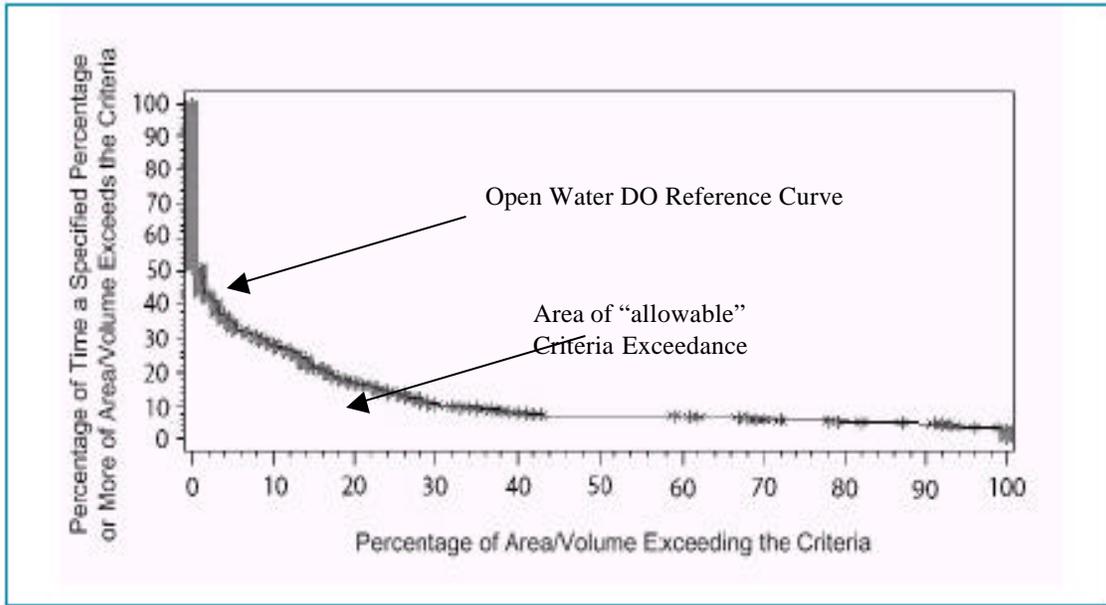


Figure A1: CBP DO Criteria Reference Curve for Defining Criteria Attainment in the Open Water Designated Use Habitats

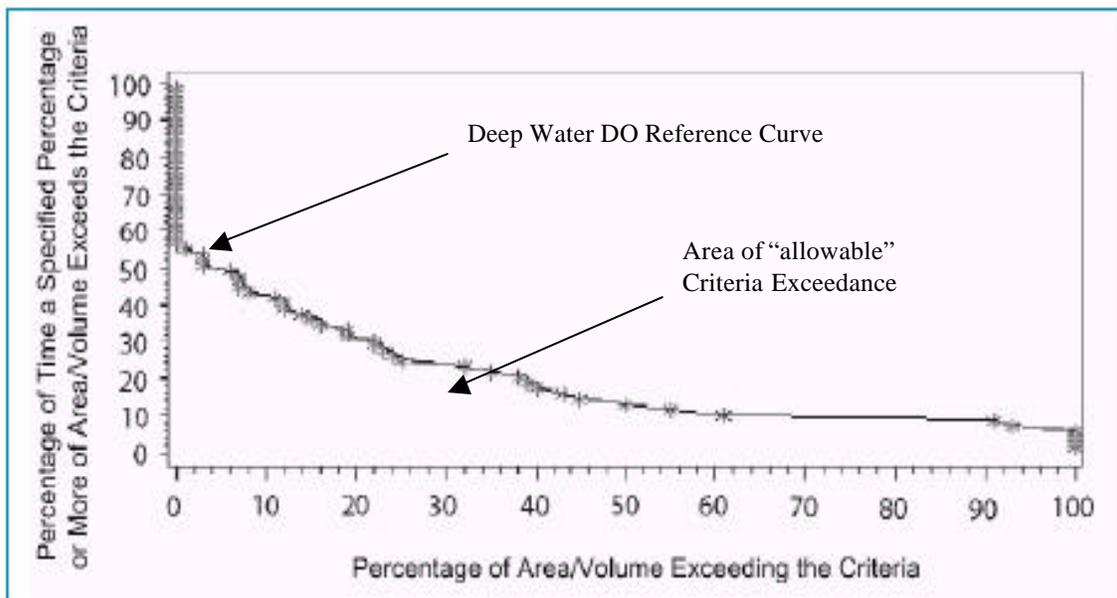


Figure A2: CBP DO Criteria Reference Curve for Defining Criteria Attainment in Deep Water Designated Use Habitats

The attainment assessment procedure is as follows: First, using the calibrated model DO output for the baseline conditions scenario period (1995-1997) DO attainment curves are developed for the Migratory Fish and Spawning, Open Water and Deep Water Designated Uses. The development of the attainment curve is based on the estimates of spatial exceedance percentages for all data available during the assessment period.

Second, the CBP reference curves are obtained in the appropriate software format. Third, the MDE-generated attainment curves are compared to the corresponding CBP reference curves. MDE quantifies the degree of criteria attainment or exceedance based on the amount of area or volume of a specific designated use region that meets or exceeds the criteria.

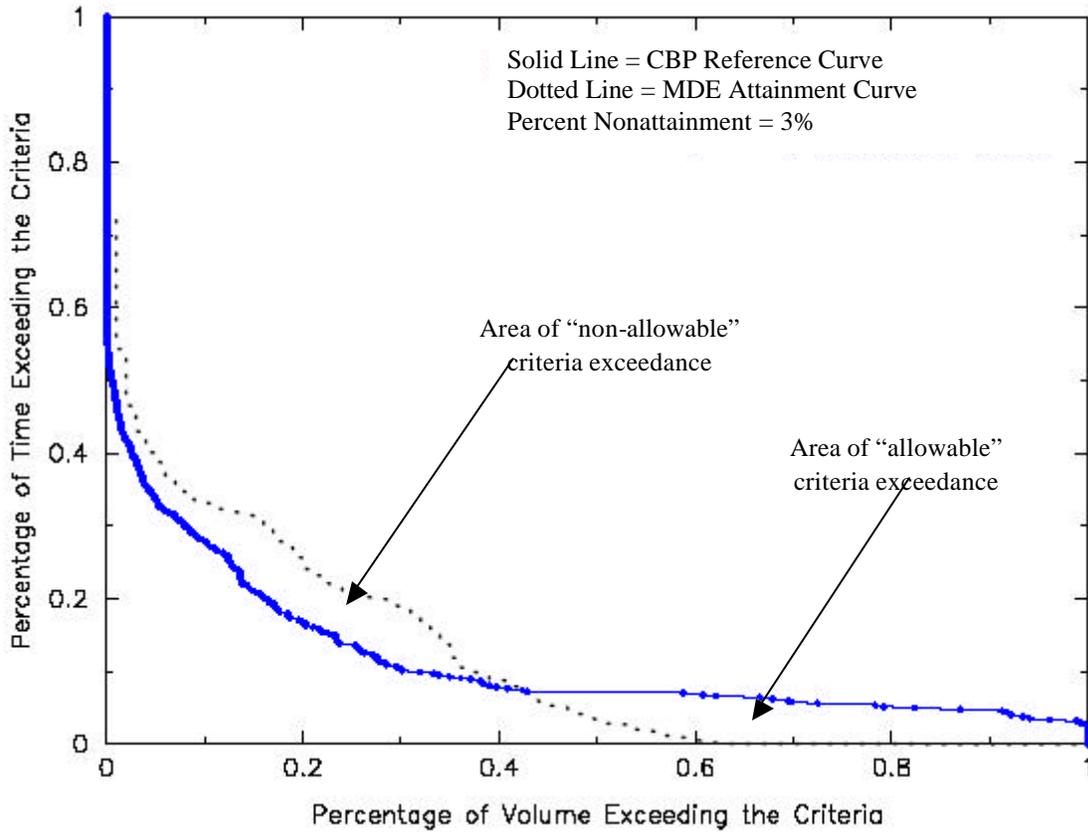


Figure A3: Baseline Scenario DO Criteria Attainment Assessment for the Migratory Fish Spawning and Nursery Designated Use for the period February 1 - May 31

The Baltimore Harbor attainment curve (dotted line) is compared to the CBP reference curve (solid line). The analysis indicates that the designated use is not attaining its criteria for 3% of the time and area assessed.

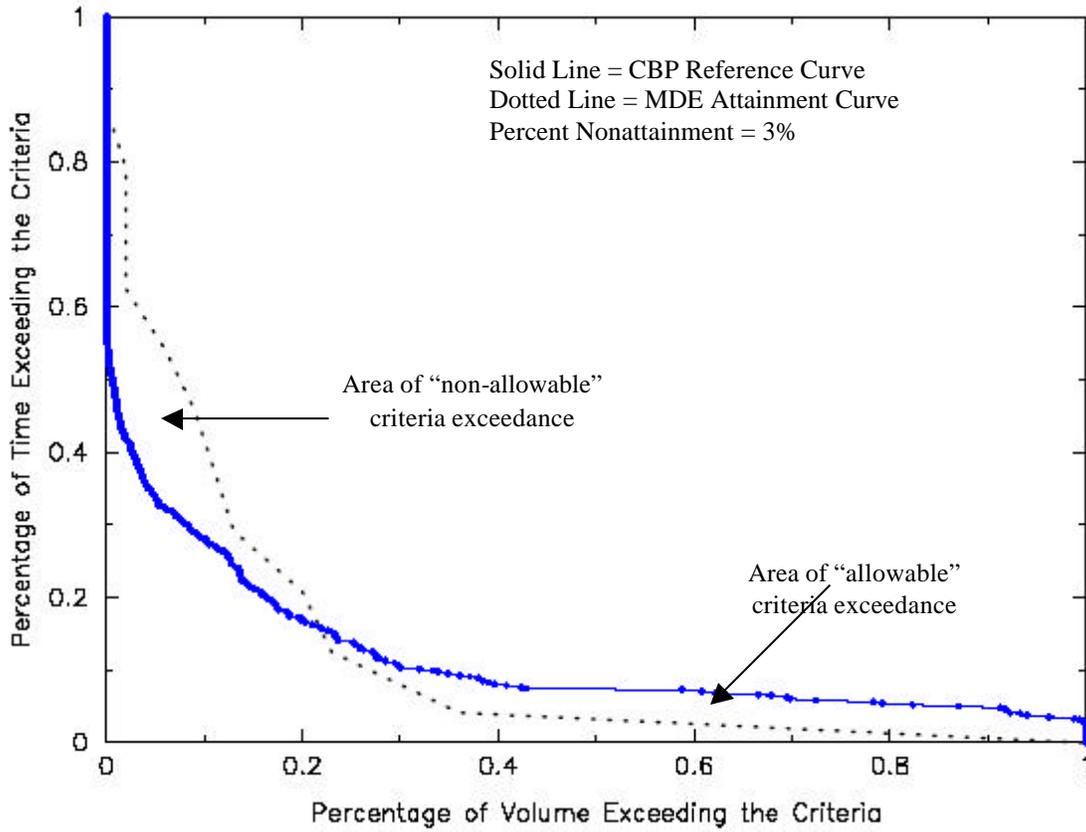


Figure A4: Baseline Scenario DO Criteria Attainment Assessment for the Open Water Designated Use for the period June 1 - September 30

The DO criteria attainment assessment for the Open Water Designated Use for the period June 1st to September 31st indicates that there is an area of nonattainment of 3%.

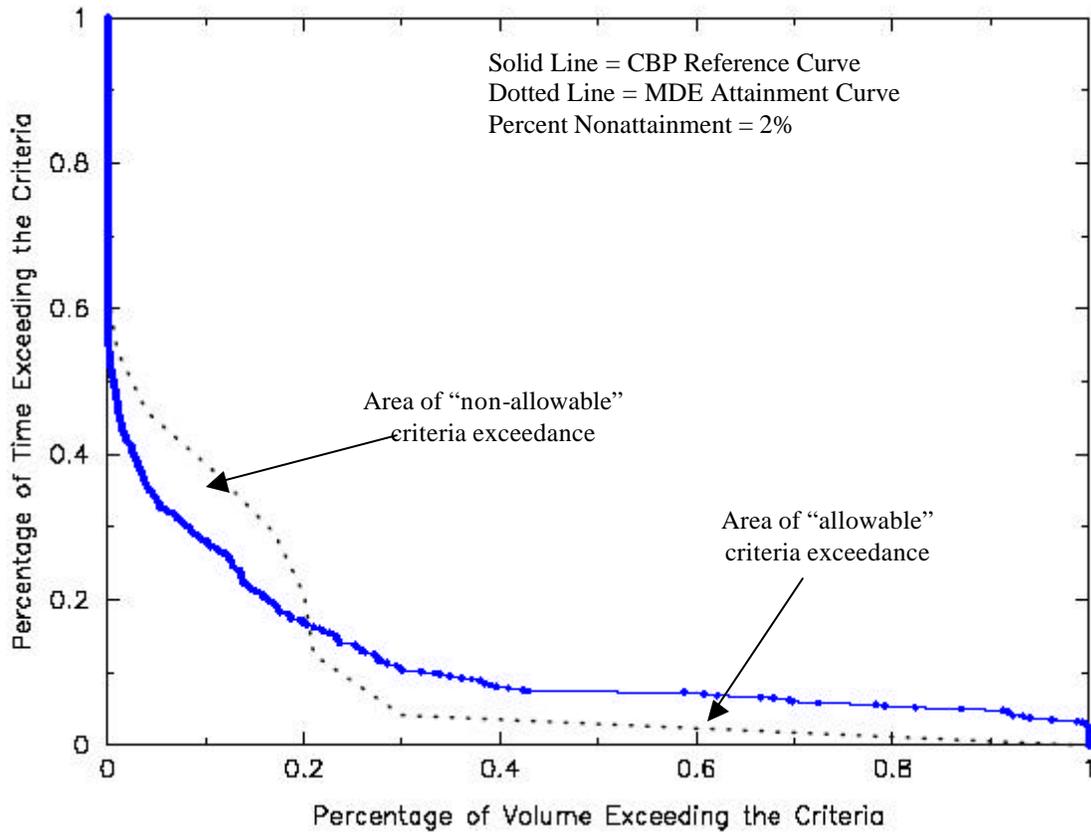


Figure A5: Baseline Scenario DO Criteria Attainment Assessment for the Open Water Designated Use for the period October 1 - January 31

The DO criteria attainment assessment for the Open Water Designated Use for the period October 1st to January 31st indicates that there is an area of nonattainment of 2%.

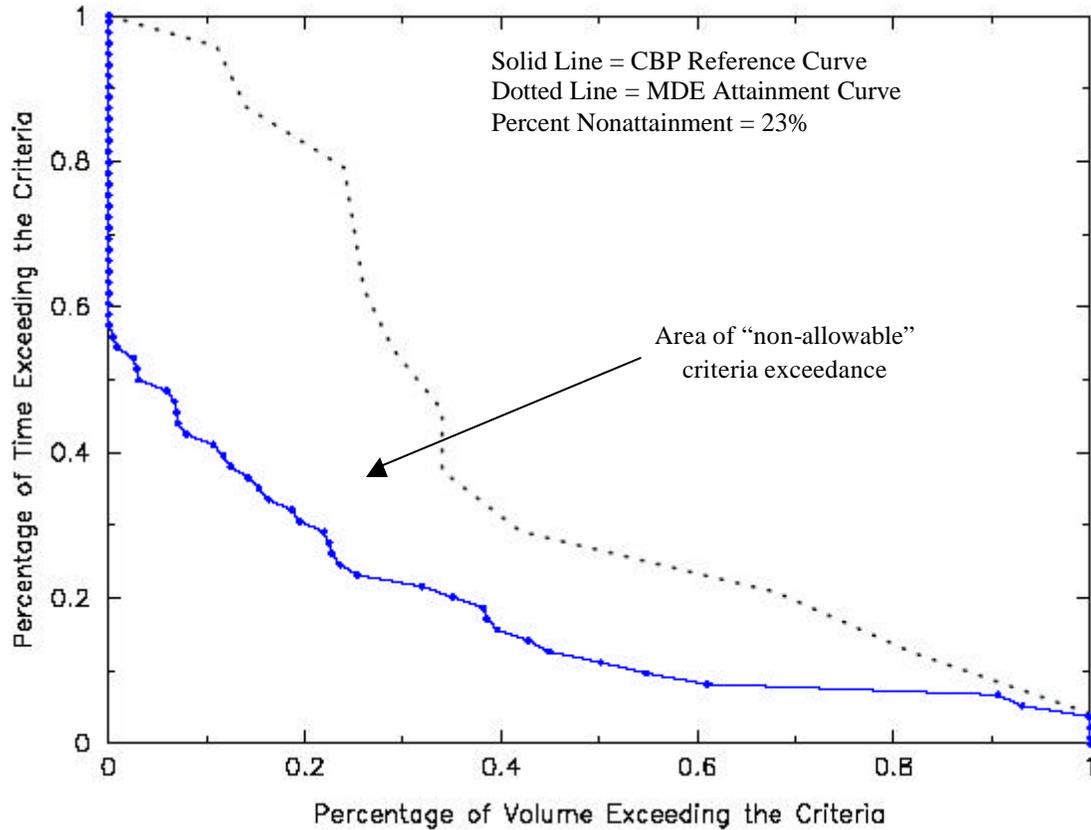


Figure A6: DO Criteria Attainment Assessment for the Deep Water Designated Use for the period June 1 - September 30

The DO criteria attainment assessment for the Deep Water Designated Use for the period June 1st to September 30th indicates that there is an area of nonattainment of 23%.

There is no DO reference curve for the Deep Channel Designated Use, which applies in the area below the lower boundary of the pycnocline to the sediment/water interface from June 1-September 30. Therefore, MDE developed an attainment analysis methodology. The methodology consisted of evaluating the water quality model DO output for the Deep Channel habitat against the 1.0 mg/l instantaneous minimum DO concentration required. The Deep Channel Designated Use attainment analysis result indicates that nonattainment of the water quality criteria occurs 87% of the time and volume.